

Motion of the Ocean
Monitor National Marine Sanctuary & The Mariners' Museum

- On the map of North Carolina label the following data buoy locations with a STAR and Buoy #:
 - Buoy # 41025/*Monitor* National Marine Sanctuary (16 miles S-SE of Cape Hatteras, NC)
 - Buoy # DUCN7/Duck Pier, NC (Outer Banks of North Carolina approx. 15 miles North of Nags Head)
 - Buoy #CLKN7/Cape Lookout, NC (Outer Banks of North Carolina south of Oregon Inlet)
- Complete the following chart based on the data provided. Compare the observed wind speed to the Beaufort Wind Force Scale and record the Beaufort Force and expected sea conditions.

* visit <http://www.ndbc.noaa.gov> and print out current data for the day of your program. You can search by Buoy # on this site

Buoy #	Site Name	Date of Observation	Nearshore or Offshore Buoy?	Wind Speed (knots)	Wave Height (ft)	Air Temperature (Fahrenheit)	Water Temperature (Fahrenheit)	Beaufort Force (0-12)	Expected Sea Conditions
41025	<i>Monitor</i> National Marine Sanctuary (Diamond Shoals)	varies	offshore						This info. is found on the Beaufort wind scale
DUCN7	Duck Pier, NC	varies	nearshore						
CLKN7	Cape Lookout, NC	varies	nearshore						

- What do you think the water temperatures at the offshore buoy differ from the **water** temperatures observed at the onshore buoys?

Sea surface temperatures in nearshore areas are influenced by runoff, higher heating/cooling rates, continental air masses, near shore ocean currents and upwelling.

- What do you think causes differences in **air** temperatures between the *Monitor* National Marine Sanctuary buoy and the Duck Pier buoy?

Radiation—in the winter air temperatures over water are warmer than air temperatures over land. The heat of the ocean is given off (radiated) into the air making the air substantially warmer.

5. Based on the recorded data is today a good day to visit the *Monitor* National Marine Sanctuary? Why/why not?

This answer will vary based on current data.

Now Let's compare ocean conditions at 3 points in time at Buoy # 41025. The USS *Monitor* sank in a storm on December 31, 1862.

1. Complete the following chart based on records from the USS *Rhode Island*, the vessel that saved some of the crew from the *Monitor* and historic and real time data from NOAA Data Buoy 41025

Buoy #	Site Name	Date of Observation	Wind Speed (knots)	Wave Height (ft)	Air Temperature (Fahrenheit)	Water Temperature (Fahrenheit)	Beaufort Force (0-12)	Expected Sea Conditions
USS <i>Rhode Island</i> log book	<i>Monitor</i> National Marine Sanctuary	12/31/1862	10	Not recorded	56	68	3	Large wavelets, scattered whitecaps, gentle breeze
41025	<i>Monitor</i> National Marine Sanctuary	12/31/2006						
41025	<i>Monitor</i> NMS	Varies based on current data						

2. Are the conditions the same or different at the site for the 3 years of recorded data?

Should be similar but different, varying depending on weather patterns and differences in data collection methods from data buoy and sailors on the *Monitor*.

3. Based . Based on the Beaufort Scale reading was December 31, 1862 an optimal day for sea travel off Hatteras? What might account for these results?

According to the records from the USS *Rhode Island* December 31, 1862 was an optimal day for travel off Hatteras. The wind speed was minimal. The data recording process in 1862 did not employ the technology that we use today and therefore is not deemed as scientifically accurate as the information we now collect. The crew member recording weather conditions did not have accurate measuring devices, and most likely had a number of duties besides weather data.